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Vostok (Antarctica) climate record time-scale deduced from the analysis of a borehole-temperature profile

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Abstract

Several sets of temperature measurements were carried out in 1972-88 in the Vostok boreholes. They have provided the ice-sheet temperature profile down to a depth of 2000m. The accuracy of the profile is sufficient to analyse perturbations induced by the surface-temperature variations over the last climatic cycle. The mathematical model developed for the ice-temperature computation is applied to solve an inverse problem. The amplitudes and phase lags of the main harmonic components in the surface-temperature variations are reconstructed on the basis of fitting the calculated ice-temperature profile to the experimental one with the assumption that Milankovich's cycles (100, 41, 23 and 19kyear) are dominant in the climate oscillations. The resultant time-scale for the Vostok record appears to be in good agreement with the dating of climate events recorded in deep-sea sediments. -from Authors
